Reducing Losses from Natural Disasters Through Performance-based Codes

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Abstract

In the past decade natural disasters in the United States have rung up staggering costs to the economy as well as extensive loss of life and property. For example, the 1993 midwest floods were estimated to have resulted in $21B in losses, Hurricane Andrew produced $30B in damage, the Northridge earthquake $15B, and losses in the 1991 Oakland (CA) wildfires reached $3B. The Federal Emergency Management Agency (FEMA), as the lead agency charged with responding to such disasters has initiated an initiative aimed at mitigating these losses through a multifaceted program that includes improving the resistance of buildings to damage from foreseeable incidents. In a separate effort, the International Code Council (ICC) is developing a model Performance-based Building Code for the U.S. This draft code includes a, risk management matrix that establishes multiple levels of performance expected of buildings to fire, flood, wind, and seismic events as a function of frequency and severity. Thus, this performance code may represent a means to evaluate the degree to which a given building design meets mitigation goals that might be proposed by FEMA or other regulatory agencies. This paper explores the possible application of the proposed ICC risk matrix for such use. Using the risk matrix for the performance measures and the verification methods and acceptable solutions referenced in the ICC code, regulatory authorities would have a framework for controlling development in areas prone to specific natural hazards, and FEMA would have a means to advance their mitigation strategy.

International Conference on Fire Research and Engineering (ICFRE3), Third (3rd). Proceedings. **Program and Abstracts.** Society of Fire Protection Engineers (SFPE), National Institute of Standards and Technology (NIST) and International Association of Fire Safety Science (IAFSS). October 4-8, 1999, Chicago, IL, Society of Fire Protection Engineers, Boston, MA, 1-1 pp, 1999.